

REMARKS

Objections to Drawings

The drawings have been objected to because they include reference signs "40" (Figures 1C, 1E), "36" (Figures 1E, 1F), and "38" (Figure 1E) not mentioned in the description.

These objections are traversed as all of the reference signs in the drawings have antecedent basis in the specification. In particular, reference sign "40" (space 40) appears at page 10, line 1 of the specification, reference sign "36" (outer portions 36) appears at page 9, line 37 of the specification, and reference sign "38" (inner portions 38) appears at page 9, line 39 of the specification.

Rejections Under 35 USC §102 and 35 USC §103

Claims 1-5, 7-13 and 64 have been rejected under 35 USC §102(b) as being anticipated by Moden (US Patent No. 6,310,390).

Claims 1-6, 14-36, 64-65 and 70-75 have been rejected under 35 USC §102(e) as being anticipated by Farnworth et al. (US Patent No. 6,451,624).

Claim 66-69 have been rejected under 35 USC §103(a) as being unpatentable over Farnworth et al. (US Patent No. 6,451,624) in view of Rostoker et al. (US Patent No. 6,373,447).

The rejections under 35 USC §102 and 35 USC §103 are traversed for the reasons to follow.

Summary of the Invention

The claims are directed to a semiconductor component 10 (Figures 1A-1C). The component 10 (Figure 1C) includes a leadframe 12 (Figure 1C), a semiconductor die 14 (Figure 1C) back bonded to the leadframe 12 (Figure 1C) in a chip on board configuration, and wire interconnects 16 (Figure

1C) bonded to the die 14 (Figure 1C) and to the leadframe 12 (Figure 1C). The component 10 (Figure 1C) also includes an array of terminal contacts 18 (Figure 1C) attached to the leadframe 12 (Figure 1C), and an encapsulant 20 (Figure 1C) encapsulating the die 14 (Figure 1C), the wire interconnects 16 (Figure 1C) and the leadframe 12 (Figure 1C).

The leadframe 12 (Figure 1E) includes leadfingers 28 (Figure 1E) having interconnect bonding sites 32 (Figure 1E) for the wire interconnects 16 (Figure 1C), and terminal bonding sites 30 (Figure 1E) for the terminal contacts 18 (Figure 1C). In addition, the terminal bonding sites 30 (Figure 1E) can be arranged in an area array such as a grid array, edge array or peripheral array. The leadframe 12 (Figure 1E) also includes bus bars 34 (Figure 1E) which physically and electrically connect selected leadfingers 28 (Figure 1E) to one another. The bus bars 34 (Figure 1E) are located proximate to inner portions 38 (Figure 1E) of the leadfingers 28 (Figure 1E), and the interconnect bonding sites 32 (Figure 1E) are located proximate to outer portions 36 (Figure 1E) of the leadfingers 28 (Figure 1E), such that shorting between the bus bars 34 (Figure 1E) and the wire interconnects 16 (Figure 1E) is eliminated.

Argument

The independent claims have been amended to emphasize features of the component which are not disclosed or suggested by the prior art. In particular, the present component includes a leadframe having leadfingers with terminal contact bonding sites in an area array. In addition, the leadfingers include bus bars configured to electrically connect selected leadfingers and selected terminal contacts. Further, the bus bars are protected by the die, such that shorting to the interconnects is less likely to occur.

In this regard, note Figure 1E of the present application in which the bus bars 34 are attached to selected terminal bonding sites 30 on the leadfingers 28. As also shown in Figure 1E, the bus bars 34 are in the area array of the terminal bonding sites 30, and the die 14 substantially covers the bus bars 34. As shown in Figure 1C, this arrangement prevents the bus bars 34 from touching and shorting to the interconnects 16.

In the cited prior art to Moden and Farnworth et al. there are no bus bars configured to electrically connect selected leadfingers. Rather, the bus bars are originally contained on the leadframe, but are trimmed out of the component. In Figure 3 of Moden the bus bars (unmarked) are present on the leadframe 34, but in Figure 1D have been trimmed away from the component 10. Similarly, in Figure 3 of Farnworth et al. the bus bars 64 are originally present, but in Figure 1B have been trimmed away from the component 10.

In addition, the bus bars in both Moden and Farnworth et al. are located outside of the area array, and outside of the die, such that shorting to the bus bars is more likely to occur. For example, note the location of the bus bars in Figure 3 of Moden and in Figure 3 of Farnworth et al. In the present component the bus bars 34 are in the area array, and the die 14 (Figure 1C) substantially covers the bus bars 34 (Figure 1E), which prevent shorting to other elements, particularly the interconnects 16.

Another distinguishing feature of the present component is that the leadfingers 28 (Figure 3A) include tip portions and terminal bonding sites 30 (Figure 3A) that are configured to provide a die mounting site 42 (Figure 3A). In this regard, note Figure 1E of the present application in which the die 14 is supported by the tip portions of the leadfingers 28 and by the terminal bonding sites 30. In Figure 3 of Moden the ball bonding pads 28 are relatively far apart such that a polymer tape 36

(Figure 1C) is required to support the die 12. In Farnworth et al. the die 14 is supported by conductive traces 22 in a board on chip configuration.

Amended independent claim 1 recites "the leadfingers having tip portions configured to provide a die mounting site on the first surface". Antecedent basis for this recitation is contained on page 8, lines 1-3 of the specification. Independent claim 1 also recites "at least one bus bar on selected tip portions connecting selected terminal bonding sites". This feature is shown in Figure 1E, and supported by the description on page 8, lines 32-38 of the specification.

Amended independent claim 5 recites "at least one bus bar electrically connecting selected leadfingers". In addition, claim 5 recites the die "substantially covering the bus bar". Antecedent basis for this recitation is contained on page 10, lines 11-15 of the specification.

Amended independent claim 14 recites terminal bonding sties "in an area array, and at least one bus bar in the area array electrically connecting selected leadfingers". Antecedent basis for area array is contained on page 10, line 38 of the specification. In addition, the bus bars 34 are shown in Figure 1E as being in the area array of the terminal bonding sites 30.

Amended independent claim 20 recites "a plurality of bus bars proximate to the inner portion electrically connecting selected leadfingers". Antecedent basis for this recitation is contained on page 9, lines 38-39 of the specification. Claim 20 also recites "interconnect bonding sites on the leadfingers on the first side located proximate to the outer periphery". Antecedent basis for this recitation is contained on page 9, lines 36-38 of the specification. Claim 20 also recites the die "substantially covering the bus bars". Antecedent basis for this recitation is contained on page 10, lines 11-15 of the specification.

Amended independent claim 27 recites "tip portions configured to form a die mounting site". Antecedent basis for this recitation is contained on page 8, lines 1-3 of the specification. Claim 27 also recites "a plurality of interconnect bonding sites on the first side outside of the die mounting site". Antecedent basis for this recitation is contained on page 9, lines 36-38 of the specification. Claim 27 also recites "a plurality of bus bars on selected tip portions electrically connecting selected leadfingers". Antecedent basis for this recitation is contained on page 8, lines 32-38 of the specification.

Amended independent claim 64 recites "at least one bus bar electrically connecting selected leadfingers". Antecedent basis for this recitation is contained on page 8, lines 32-38 of the specification. Claim 64 also recites "a semiconductor die back bonded to the leadfingers substantially covering the bus bar". Antecedent basis for this recitation is contained on page 10, lines 11-15 of the specification.

Amended independent claim 70 recites "at least one bus bar in the area array". Antecedent basis for area array is contained on page 10, line 38 of the specification. In addition, the bus bars 34 are shown in Figure 1E as being in the area array of the terminal bonding sites 30. Claim 70 also recites a semiconductor die "substantially covering the bus bar". Antecedent basis for this recitation is contained on page 10, lines 11-15 of the specification.

In view of the above noted recitations the amended claims "taken as a whole" are submitted to be novel and unobvious over the art.

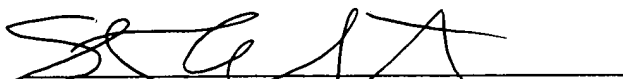
Conclusion

In view of the amendments and arguments favorable consideration and allowance of claims 1-36 and 64-75 is requested. An Information Disclosure Statement is being filed concurrently with this Amendment. Should any issues

remain, the Examiner is requested to contact the undersigned by telephone.

DATED this 19th day of August, 2004.

Respectfully submitted:



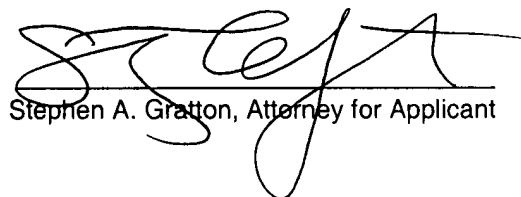
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